

****Volume Title****

*ASP Conference Series, Vol. **Volume Number***

****Author****

© ****Copyright Year**** *Astronomical Society of the Pacific*

PACS spectroscopy of OH/IR stars

R. Lombaert¹, B. L. de Vries¹, L. Decin^{1,2}, J.A.D.L. Blommaert¹, P. Royer¹, E. De Beck¹, A. de Koter^{2,3}, L. B. F. M. Waters^{2,4}

¹*Instituut voor Sterrenkunde, K.U.Leuven, Celestijnenlaan 200D, B-3001 Leuven, Belgium*

²*Astronomical Institute “Anton Pannekoek”, University of Amsterdam, Science Park XH, Amsterdam, The Netherlands*

³*Astronomical Institute Utrecht, University Utrecht, P.O. Box 80000, 3508 TA Utrecht, The Netherlands*

⁴*Netherlands Institute for Space Research, Sorbonnelaan 2, 3584 CA Utrecht, The Netherlands*

Abstract. Observations of high-excitation molecular emission lines can greatly increase our understanding of AGB winds, as they trace the innermost regions of the circumstellar envelope. The PACS spectrometer on-board the Herschel Space Telescope¹, provides for the first time the spectral resolution and sensitivity necessary to trace these lines. We report on the first modelling efforts of a PACS spectral scan for the OH/IR star V669 Cas. Central to our methodology is the consistent treatment of both dust and gas by using a line radiative transfer and a continuum radiative transfer code conjointly. Water emission lines are found to be extremely sensitive to the dust-to-gas ratio, emphasizing the need of consistent modelling for dust and gas.

1. PACS and its view

The PACS spectrometer (Poglitsch et al. 2010) on-board the Herschel Space Telescope (Pilbratt et al. 2010), covers the wavelength range between 50 μm and 200 μm at a resolution of typically 1000. In comparison to the ISO LWS instrument, PACS offers a higher resolution and a better sensitivity. With PACS, we can observe a wide range of molecular emission lines in the innermost regions of circumstellar envelopes (CSE) of AGB stars, including CO and H₂O, which are major coolants and thus important for determining the thermodynamical structure of these environments.

2. Methodology and preliminary results

Kinematical, thermodynamical and chemical information about the circumstellar shell is provided by molecular emission lines and dust features. This information is derived

¹Herschel is an ESA space observatory with science instruments provided by European-led Principal Investigator consortia and with important participation from NASA.

